Are There Distinct Subgroups of Rethinking Care Clients? A Cluster Analysis of Assessment Data

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ABSTRACT

Although the clients enrolled in the Rethinking Care (RTC) Program share important characteristics, clinical anecdotes as well as previous research suggests there might be subsets of clients. The current cluster analyses revealed two distinct groups of clients. One group is younger and reports significant alcohol and drug use, significant abuse history, isolated living situation, and significant mental health problems. In contrast, a second group is more likely to be married, report social support, report few alcohol/drug problems, but is more likely to report physical health problems that interfere in their daily functioning. Broadly, these results describe a set of clients with primarily addiction/mental health problems and a second with primarily physical health problems. Future analyses could examine whether these client groups relate to outcomes (i.e., healthcare utilization and costs), which will be examined when we conduct the quantitative evaluation of RTC Program outcomes.

Background

Rethinking Care (RTC) is a program funded by the Washington State Health and Recovery Services Administration (HRSA) within the state Department of Social and Health Services (DSHS). The RTC Program is being carried out in collaboration with King County Care Partners (KCCP) and the Center for Healthcare Strategies (CHCS). Its purpose is to improve quality and reduce expenditures for Supplemental Security Income (SSI) recipients with co-occurring medical and mental health/substance abuse problems. The RTC Program is a randomized controlled trial to allow for a rigorous evaluation of its impact on client outcomes. Approximately 1,560 eligible individuals will be randomly assigned to either the RTC intervention or to a treatment-as-usual abeyance group over a two-year period beginning February 1, 2009.

The Center for Healthcare Improvement for Addictions, Mental Illness and Medically Vulnerable Populations (CHAMMP) located within the University of Washington at Harborview Medical Center was commissioned by DSHS to carry out a qualitative evaluation of the RTC Program. One component of this evaluation is an analysis to determine if there are distinct subgroups of clients who have participated in the intervention.

Objective

Clients participating in the RTC project share certain characteristics. Specifically, clients were eligible for the program because they had at least one chronic physical condition, evidence of mental health problems and/or substance abuse, and a risk of future health care costs 50% or higher (risk score of 1.5 or higher) than the average Medicaid SSI client. However, clinical impressions as well as previous qualitative research suggest that there may be distinct subgroups of clients participating in the program. Identifying subgroups of clients could focus treatment efforts and provide insight into important client characteristics that may moderate treatment effects. The objective of the analysis reported here was to quantitatively explore whether there are distinct subgroups of clients in the Rethinking Care Program.

Method

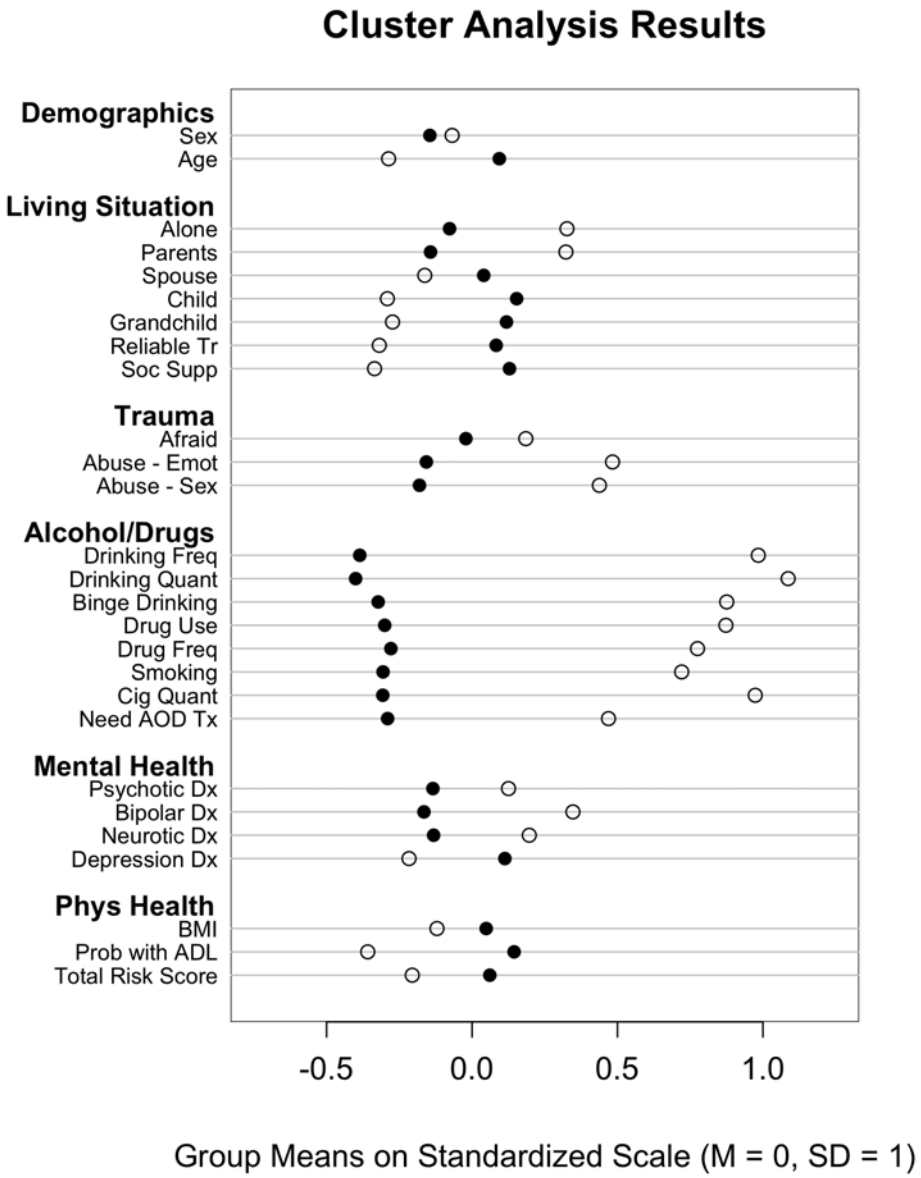
As an initial step in the RTC program, clients complete a comprehensive nursing assessment. Information from this assessment was the primary data source for the current analyses (obtained from the assessment file of the KCCP database), though it was augmented with items from the Client Outcomes Database (CODB).[1] Items included in the current analysis covered: 1) client's living situation (e.g., who do they live with? Do they have reliable transportation?), 2) trauma history (e.g., Have they experienced emotional or sexual abuse?), 3) alcohol and drug use (e.g., quantity and frequency of alcohol and drug use), 4) mental health indicators (from CODB), and 5) physical health indicators (e.g., Body Mass Index [BMI], problems with activities of daily living). All items included in the current analysis are shown in the Appendix in the order that they appear in Figure 1. In addition, the nursing assessment tool underwent a significant revision during the RTC project, which limited the utility of some data (see Limitations section).

Out of a total of 406 clients who had been randomized to the RTC intervention in February and March 2009, 228 clients had some assessment data, but only 166 clients had enough data to

be included in the present analyses. Thus, 228/406, or 56%, had any assessment data and 166/406, 41%, had complete assessment information for the present analyses.

Results

Cluster analysis was used to determine whether subgroups of individuals had similar profiles of scores across sets of items.[2] Results strongly suggested two clusters, encompassing the entire sample. To interpret the results, the means of the two groups are plotted across all items in Figure 1 (after items were converted to a standardized scale, with M = 0 and SD = 1). As seen in Figure 1, there is clear separation of the two groups across a number of items and categories: Group 1 (*n* = 50; defined by open circles) is younger, more likely to live alone or with their parents, and have less reliable transportation and social support. Group 1 is also more likely to report a trauma history including emotional and sexual abuse. There is clear separation on drinking and drug use, with Group 1 reporting notably higher means on all items. In particular, the difference in means on a standardized scale is approximately equal to Cohen's *d* effect size. By this metric, the *d* effect sizes between groups for drinking and drug use are often greater than 1. Moreover, clients in Group 1 are more likely to have serious mental illness (i.e., psychotic or bipolar diagnoses). Finally, Group 2 (*n* = 116) is more likely to be overweight, report problems with activities of daily living, and have a higher likelihood of elevated future healthcare costs (i.e., Total Risk Score estimated using data from the CODB).



Comment

The current cluster analyses present two distinct groups of clients receiving care as part of the Rethinking Care Program. One group reports significant alcohol and drug use, significant abuse history, isolated living situation, and significant mental health problems. In contrast, a second group is more likely to be married, report social support, report few alcohol/drug problems, but is more likely to report physical health problems that interfere in their daily functioning. Broadly, these results describe a set of clients with primarily addiction/mental health problems and a second with primarily physical health problems. A follow-up question of interest is whether these client groups might relate to outcomes (i.e., healthcare utilization and costs). We will examine this question when we conduct the quantitative evaluation of RTC outcomes.

Limitations/Suggestions

Without external validation of some kind, all cluster analyses should be considered descriptive as opposed to definitive. In addition, analyses were hampered somewhat by a significant revision to the assessment tool that occurred part way through the Rethinking Care project. Hence, only common items across both the original and revised assessment tools were used in the present analysis.

Endnotes

[1] http://www.dshs.wa.gov/pdf/ms/rda/research/11/144.pdf

[2] Cluster analysis is a broad area of statistics that includes methods for identifying latent groups. There are two broad classes of cluster analysis: 1) k-means cluster analysis in which a pre-specified number of clusters is recovered from the data, and 2) agglomerative clustering in which individual records (i.e., clients) are successively joined together with results typically presented in a dendrogram. The current cluster analysis uses a relatively new method that combines both approaches (Chipman & Tibshirani, 2006). Specifically, repeated agglomerative clusterings are run, varying the linkage function (i.e., how clients are joined in forming clusters). These runs define a set of mutual clusters that are highly similar groups of clients that should never be split across clusters. A final cluster analysis is now run on the mutual clusters to define the overall clustering structure in the data. Results using simulated data as well as actual genetic data show that this hybrid clustering approach has advantages over earlier k-means/agglomerative approaches to cluster analysis.

Chipman, H., & Tibshirani, R. (2006). Hybrid hierarchical clustering with applications to microarray data. *Biostatistics, 7,* 286-301.

APPENDIX

Unless otherwise noted items below came from the KCCP nursing assessment interview.

Living Situation:

1. Who lives with you?
   ☐ Alone ☐ Spouse/Partner ☐ Daughter/Son ☐ Grandchildren
   ☐ Parents ☐ Friends

2. Are you concerned about your housing situation?
   ☐ Yes ☐ No

3. Do you have dependable transportation for medical appointments or other activities?
   ☐ Yes ☐ No

4. Is there someone you can count on to help if you need it?
   ☐ Yes ☐ No

Trauma:

1. Are you afraid of your partner, a family member, friend, or roommate?
   ☐ Yes ☐ No

2. Has he/she ever put you down, said hurtful things, or threatened you?
   ☐ Yes ☐ No

3. Has he/she ever threatened or forced you to have sexual contact?
   ☐ Yes ☐ No

Alcohol/Drugs:

1. How often have you had a drink containing alcohol in the last year? Consider a "drink" to be a can or bottle of beer, a glass of wine, a wine cooler, or one cocktail or shot of hard liquor (like scotch, gin, vodka).
   ☐ Never ☐ Monthly or less ☐ 2-4x/mo ☐ 2-3x/wk ☐ >4 days/wk

2. How many drinks containing alcohol did you have on a typical day when you were drinking in the last year?
   ☐ I do not drink ☐ 1-2 drinks a day ☐ 3-4 drinks ☐ 5-6 drinks ☐ 7-9 drinks
   ☐ 10 or more

3. How often in the last year have you had 6 or more drinks on one occasion?
   ☐ Never ☐ Less than monthly ☐ Monthly ☐ Weekly ☐ Daily

4. Are you presently using any street or illegal drugs, misusing prescribed medications, glue, or inhalants?
   ☐ Yes ☐ No

Tobacco Use:

1. Do you use tobacco now?
   ☐ Yes ☐ No

2. If yes, how much do you smoke per day? Pack quantity _____

Mental Health:

Need for alcohol and drug treatment as well as mental health diagnosis indicators for psychosis, bipolar/mania, neurosis, and depression were taken from the CODB.

Physical Health:

Body Mass Index (BMI): Calculated from patient's height and weight via: weight (in kg)/height (m^2)

Problems with Activities of Daily Living (ADL)

Note: Summarized as a single score in analyses.

I would like to ask you about some activities of daily living, things that we need to do part of our daily lives. I would like to know if you can do these activities without any help at all, with some help, or if you can't do them at all.

1. Can you use the telephone?
   ☐ Without help ☐ With some help ☐ Unable

2. Can you get to places out of walking distances?
   ☐ Without help ☐ With some help ☐ Unable

3. Can you go shopping for groceries or clothes (assuming transportation)?
   ☐ Without help ☐ With some help ☐ Unable

4. Can you prepare your own meals?
   ☐ Without help ☐ With some help ☐ Unable

5. Can you do your housework?
   ☐ Without help ☐ With some help ☐ Unable

6. Can you take your own medicine?
   ☐ Without help ☐ With some help ☐ Unable

7. Can you handle your own money?
   ☐ Without help ☐ With some help ☐ Unable

Total Risk Score: A summary score that estimates risk of future health care costs 50% or higher (risk score of 1.5 or higher) than the average Medicaid SSI client using data from the CODB.